DØ Luminosity Stability
Forward Muon Yields vs. Time and Instantaneous Lumi
Run IIb

- Forward muon yields
- Two plots
  - Forward muon yields vs. instantaneous luminosity
  - Forward muon yields vs. time in Run IIb

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for the DØ Experiment
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Forward Muon Special Runs

- DØ periodically takes special runs triggering on single muons measured in the forward muon detectors for monitoring purposes

- A pseudo cross-section called the "muon yield (Y)" is calculated:

$$Y = \frac{\text{Number of reconstructed muons}}{\text{Integrated luminosity in special run}}$$

- The muon yields can potentially reveal instabilities in the luminosity measurement

- The following plots show normalized yields defined as

$$Y_{norm} = Y \,/\, (\text{mean value})$$

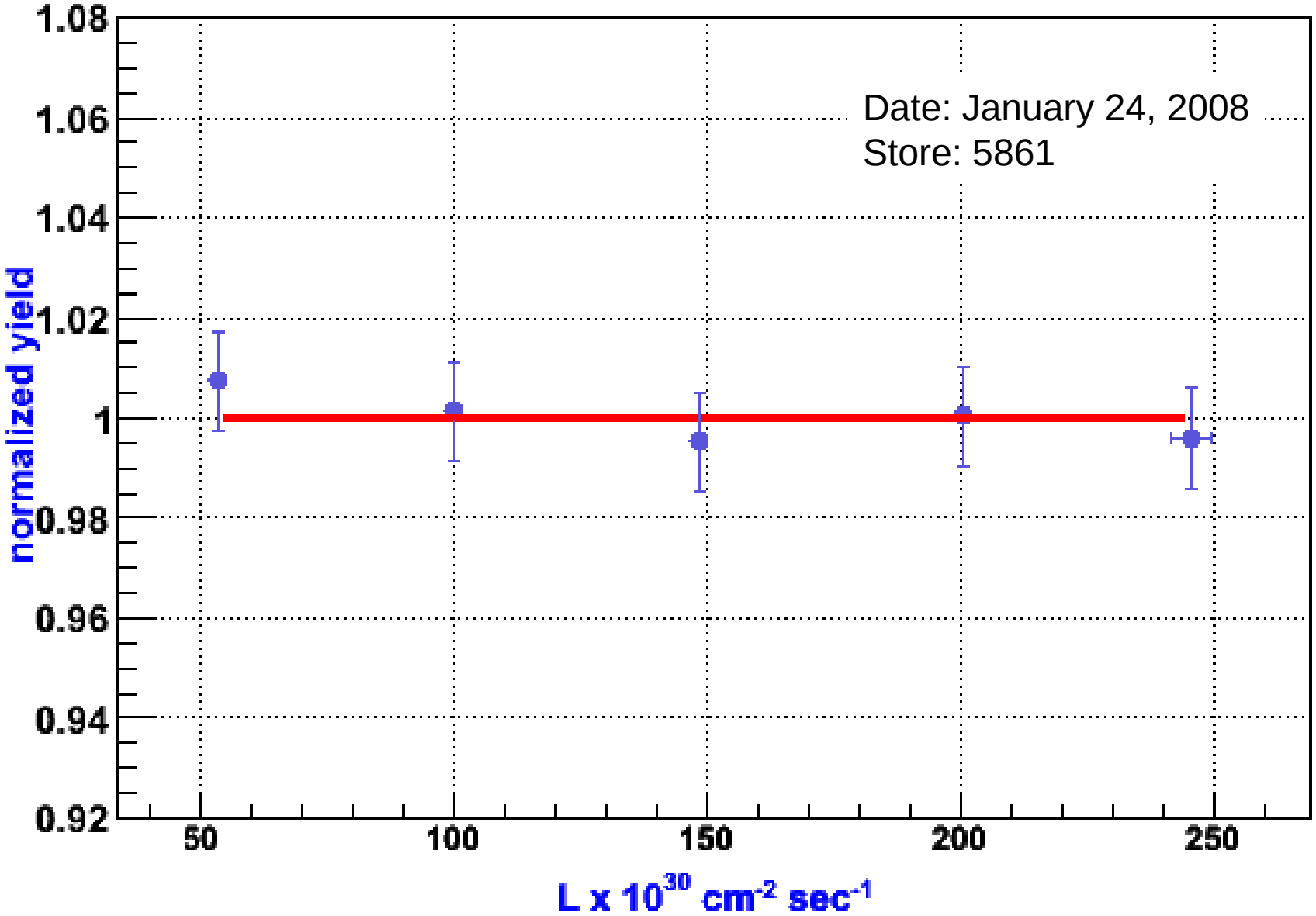
- We estimate an uncertainty of about 1% (stat + syst) for the Y_{norm} values

Special forward muon triggered runs were taken on 01/24/08 in store 5861 with initial luminosity 249E30. This table contains information about these runs.

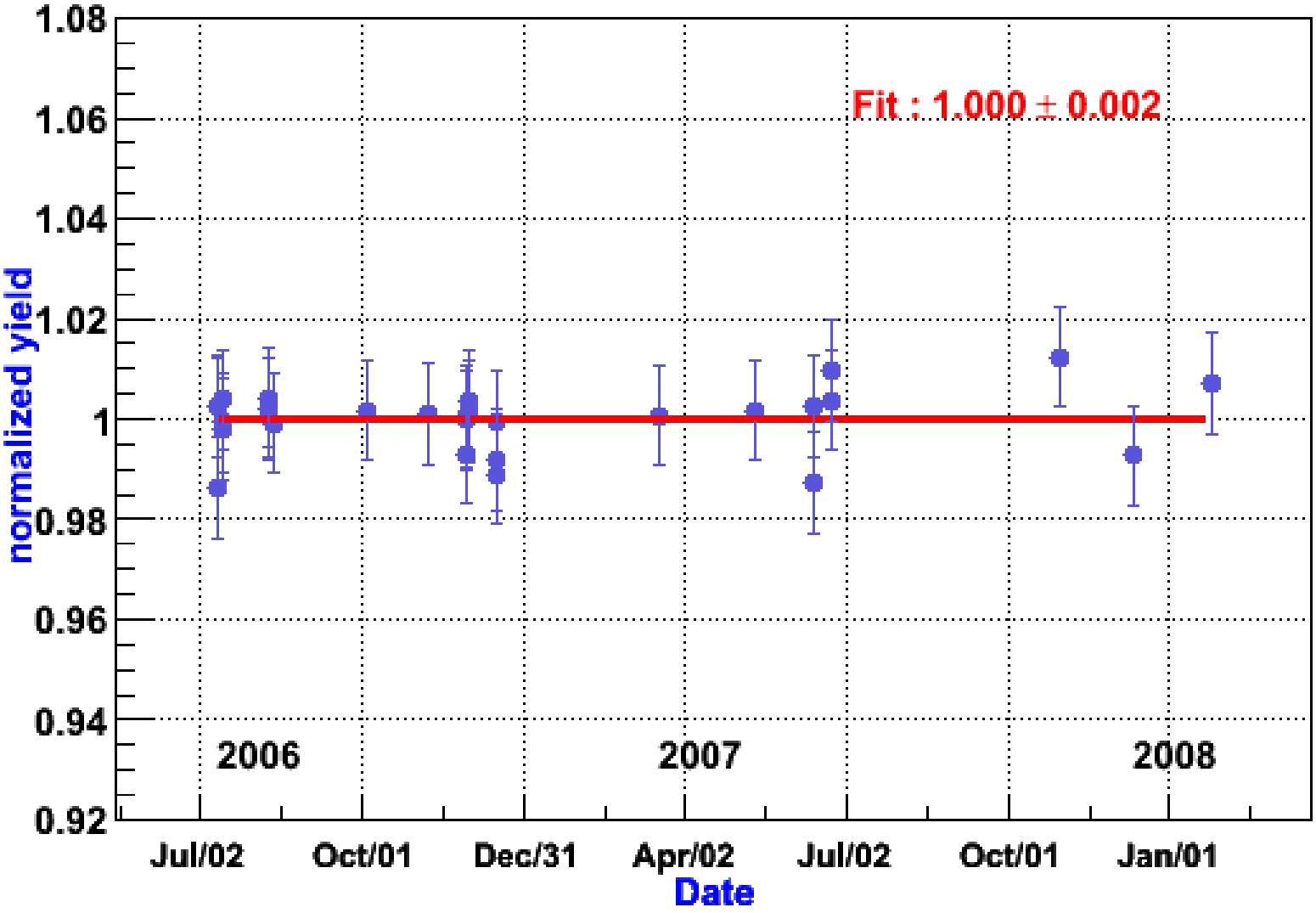
RunNo	Inst.Lum $\times 30^{30} sm^{-2} sec^{-1}$	Yield (μb)
239547	249.3-241.6	4.41 ± 0.04
239551	201.3-199.5	4.43 ± 0.04
239554	149.5-148.1	4.41 ± 0.04
239557	100.2-99.9	4.44 ± 0.04
239563	54.2-53.4	4.47 ± 0.05

Single Muon Yields. January 2008

S.Kulikov 01/28/08



Single Muon Yields from July 2006 to January 2008.



Summary

The DØ forward muon yield measurements point to:

- **~1% stability in the luminosity measurement over time (June 2006 to January 2008)**

- **~1% stability in the luminosity measurement vs. instantaneous luminosity (L = 50E30 $\rightarrow$ 250E30)**